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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,474	02/04/2004	Thomas Qiuxiong Hu	10326-97US KPM/kf	1921
20988	7590	10/04/2006	EXAMINER	
OGILVY RENAULT LLP 1981 MCGILL COLLEGE AVENUE SUITE 1600 MONTREAL, QC H3A2Y3 CANADA			HUG, ERIC J	
			ART UNIT	PAPER NUMBER
			1731	

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/770,474

Applicant(s)

HU ET AL.

Examiner

Anna Kinney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 and 34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6-9,13,14,16-25 and 34 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☒ Claim(s) 2-5 and 10-12 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 20060926.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Claims 2-5, 10-11, and 13, directed to species where  $Y_1$  and  $Y_2$  are both absent, previously withdrawn from consideration as a result of a restriction requirement, are hereby rejoined. Claims 26-32, directed to the invention(s) of pulp, paper sheet, and lignocellulosic material products have NOT been rejoined. Furthermore, claim 12, directed to the species where  $t=1$ , has NOT been rejoined. Also, the substituents for optional substitution of R groups in claims 1, 2, 6, and 31, and the species from which X is selected in claim 8 have NOT been rejoined. The Examiner acknowledges that claims 26-32, subject to the original restriction requirement, have been cancelled.

Because a claimed species previously withdrawn from consideration under 37 CFR 1.146 has been rejoined, **the restriction requirement between species of a compound of formula (A) where  $Y_1$  and  $Y_2$  are both present or both absent as set forth in the Office action mailed on November 24, 2005 is hereby withdrawn.** In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

However, pursuant to MPEP 811.02, this application contains claims directed to the following patentably distinct species: a compound of formula (A) where Y<sub>1</sub> is either present or absent and (when t=1) where Y<sub>2</sub> is present or absent. This species definition is revised from the species definition of the Office Action mailed on November 24, 2005 between a compound of formula (A) where Y<sub>1</sub> and Y<sub>2</sub> are both present or both absent, and the reasons the species are independent or distinct remains the same.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species.

MPEP § 809.02(a).

During a telephone conversation with Kevin Murphy on September 21, 2006, a provisional election was made without traverse to prosecute the invention of (when t=0) Y<sub>1</sub> is present, claims 6-9 and 13-15. Affirmation of this election must be made by

applicant in replying to this Office action. Claims 2-5 and claims 10-11 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Although applicant indicated that claim 15 is representative of compound of formula A when Y1 is absent, the Examiner disagrees. The phosphorus is joined to four functional groups, 3 of which are CH<sub>2</sub>OH, and the 4<sup>th</sup> of which is CH<sub>2</sub>CH<sub>2</sub>COO<sup>-</sup>. Only one phosphorus is present, indicating that t=0, and X is not present. Therefore, the 4 functional groups must be represented by R1, R2, R3, and Y1.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Response to Arguments***

Applicant's arguments, see Remarks, 1<sup>st</sup> paragraph of pg. 11, filed July 26, 2006, with respect to the rejection(s) of claim(s) 1, 6, 7, 9, 16, 18, 20-23, and 25 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Davidson and Bowdery.

In response to applicant's argument that Davidson does not teach that the phosphonium compound bleaches pulp, the Examiner disagrees. Davidson discloses that THPC provides a higher brightness than the control before irradiation (pg. 427, Fig.

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4), which the Examiner construes to demonstrate bleaching. The fact that Davidson does not discuss the bleaching abilities of THPC appears to be based upon post-irradiation brightness results (pg. 422, Table 1) which show a higher brightness index for Rongalit, Blankit, and Potassium metabisulphite than for THPC. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In response to applicant's argument that Bowdery has no relevance to the purposes of the present invention, the Examiner disagrees. Bowdery discloses addition of THPS to pulp, and bleaching the pulp (pg. 5, paragraphs 3 and 4). The claims as written do not exclude the addition of hydrogen peroxide. The catalase destruction observed by Bowdery does not indicate that THPS is not present during bleaching, which the Examiner construes as bleaching with THPS.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 6-11, 14-25, and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because in line 9 of the claim, the limitation "when t=1, R5 is absent, an alkylene group..." appears to allow no conditions under which R5 is present.

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Furthermore, the limitations of lines 25 and 28 appear to contradict each other, in that line 25 recites Y1 as "independently absent or a carboxylate moiety", and line 28 recites "Y1 is a hydroxymethyl group". Finally, the stabilizing step of lines 33-34 does not clearly recite whether "said compound of formula A" is intended to be the same compound as that selected for bleaching, or only a compound from the same group of compounds represented by formula A, nor does it clearly indicate whether the limitations imposed upon formula A in the bleaching step also apply to the compound of formula A in the stabilization step.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1, 6-9, 13-14, 16, 18, 20-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson (R. S. Davidson et al, A Study of the Photoyellowing of Paper Made from Bleached CTMP, Journal of Wood Chemistry and Technology, 11(4), 419-437, 1991; provided by applicant) in view of Bowdery et al (WO 01/53602).

With respect to claim 1, Davidson discloses a method of bleaching of a lignocellulosic material comprising bleaching the lignocellulosic material (pg. 427, Fig. 4; THPC vs. control at 0 min.) with tetrakis (hydroxymethyl) phosphonium chloride (i.e., THPC; pg. 427, Fig. 4) a water-soluble phosphonium compound (pg. 432, 3<sup>rd</sup> full ¶) of

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formula (A), wherein  $t = 0$ ,  $R_4R_5PY_2$  is absent, and  $R_3$  is bonded to the P of the  $R_1R_2PY_1$  group,  $m$  is an integer of 1 and  $y$  is an integer of 1, and  $n$  and  $z$  are integers of 1 such that  $yn=zm$ ; wherein  $X$  is present and is an inorganic anion (i.e., chloride), and  $Y_1$ ,  $R_1$ ,  $R_2$ , and  $R_3$  are hydroxymethyl (i.e. alkyl) groups, and stabilizing the brightness in the resulting bleached lignocellulosic material with said compound of formula A (pg. 422, Table 1, row 11).

Davidson does not disclose expressly the solubility of the compound of formula (A). At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the compound of Davidson would intrinsically have the same solubility as the compound of formula (A), since they share the same functional groups bound to a P atom.

If necessary, Bowdery discloses a method of bleaching lignocellulosic material (Title) with tris (hydroxymethyl) phosphine or a tetrakis (hydroxymethyl) phosphonium salt (Abstract), including THPC (pg. 2, 2<sup>nd</sup> full ¶).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to bleach pulp with the compound of formula (A) as described by Bowdery, in the bleaching and brightness stabilization method of Davidson, to obtain the invention as specified in claim 1.

The suggestion would have been that it is a source of a tervalent phosphorus compound which is able to reduce peroxidic species (Davidson, pg. 431, lines 8-15) and thus destroy peroxidic species which may lie along the reaction pathways leading to the coloured species of lignin (Davidson, pg. 430, 1<sup>st</sup> ¶).



With respect to claims 6-9 and 13, Davidson and Bowdery are applied as in the rejection to claim 1, above.

With respect to claim 14, Bowdery discloses that the compound is THPS (pg. 2, 1<sup>st</sup> full ¶).

With respect to claim 16, Davidson discloses a mechanical wood pulp (i.e., CTMP; pg. 419, Abstract, lines 1-4).

With respect to claim 18, Davidson discloses a mechanical wood pulp that has been bleached with other bleaching chemicals (pg. 421, lines 12-14).

With respect to claim 20, Davidson discloses that the lignocellulosic material is a paper sheet containing mechanical wood pulp (pg. 421, lines 12-14).

With respect to claims 21 and 22, Davidson discloses that the bleaching and stabilization is conducted in an aqueous medium (pg. 432, 2<sup>nd</sup> full ¶) for 24-100 hours (pg. 422, Table 1), which contains 2 specific points within the claimed range of 5 minutes to 30 days, with a charge of the phosphorus compound being a 2% solution, which the Examiner presumes would provide a charge within the claimed range of 0.01 to 6.0% by weight, based on the oven-dry weight of the lignocellulosic material.

At the time of the invention, absent a showing of unexpected results, it would have been obvious to a person of ordinary skill in the art to optimize the temperature, pH of the solution and the consistency of the lignocellulosic material to achieve the necessary solubility and application rate of the compound. Furthermore, the wide ranges claimed indicates a lack of criticality. It has been held that discovering the optimum or workable ranges or an optimum value of a result effective variable involves

only routine skill in the art. See MPEP 2144.05 II.

With respect to claim 23, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an appropriate vessel to contain the lignocellulosic material and compound during bleaching and stabilization.

With respect to claim 25, Davidson is applied as in the rejection to claims 21 and 22, above.

Claims 17, 19, 24, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson in view of Bowdery as applied to claims 1 and 16 above, and further in view of Liebergott et al (U.S. Patent 4,804,440).

With respect to claim 17, Davidson and Bowdery do not disclose expressly furnish.

Liebergott discloses a method of bleaching lignocellulosic material that is mechanical wood pulp, chemical wood pulp (col. 2, lines 1-6), and also discloses spruce expressly (col. 8, lines 22-25 and col. 5, lines 23-28).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the bleaching process of Davidson and Bowdery to the furnish of Liebergott to obtain the invention as specified in claim 17.

The motivation would have been to give high brightness levels to high-yield and ultra high-yield pulps (col. 1, lines 59-61).

With respect to claim 19, Davidson and Bowdery do not disclose expressly that the lignocellulosic material is chemical wood pulp.

Liebergott is applied as in the rejection to claim 17.

With respect to claims 24 and 34, Davidson and Bowdery do not disclose expressly adding a yellowing inhibitor or chelating agent or additional bleaching.

Liebergott discloses adding an organic chelating agent to remove naturally occurring trace metals (col. 1, lines 21-25) and discloses that two stage bleaching with dithionite in the second stage is well known and applied commercially (col. 1, lines 38-41).

### ***Allowable Subject Matter***

Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Reasons for allowance were provided in the previous Office Action.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 3,595,604 shows a process for whitening and retarding sunlight yellowing of protein fibers by treating with tetrakis (hydroxymethyl) phosphonium chloride. US 5,580,422 shows bleaching of pulp in the presence of a quaternary phosphonium compound. US 4,751,015 shows a bleach precursor comprising a quaternized phosphonium group. GB 1 401 312 shows a process for bleaching materials in the presence of a quaternary phosphonium group.

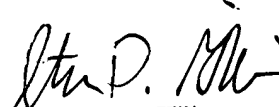
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Kinney whose telephone number is (571) 272-8388. The examiner can normally be reached on Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALK

  
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